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REDUCE Installation Guide
for CRAY Computers Running UNICOS

(Version 3.3)

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Abstract

This guide describes the CRAY/UNICOS REDUCE distribution tape and the procedures for installing, testing and maintaining REDUCE on a CRAY-1, CRAY X-MP, CRAY Y-MP or CRAY-2 computer running UNICOS. This document was derived from the corresponding document for Vax/Unix prepared by Dr. A. C. Hearn and L. R. Seward. The Rand Corporation, Santa Monica, publication CP84.

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1. Introduction

This guide describes the CRAY/UNICOS REDUCE distribution tape and procedures for installing, testing and maintaining REDUCE on a CRAY 1, CRAY X-MP, CRAY Y-MP or CRAY-2 computer running UNICOS. REDUCE is based on Standard LISP, and this version requires the availability of Portable Standard Lisp (PSL), version 3.4 or later. The PSL files necessary to run REDUCE are included on the system tape. This is not however a complete PSL system and in particular does not include PSL sources. A complete PSL (version 3.4), if needed, is available separately from CRAY Research Inc. by contacting your Cray representative.

2. Description of the CRAY/UNICOS REDUCE Distribution Tape

First of all, please choose the appropriate directory for REDUCE at your site. This directory (called REDUCEdir) must be readable for any REDUCE user. The easiest way to undump the installation tape is:

```
cd REDUCEdir
tar -x .
```

It may be useful to move the binary file "reduce" to the standard directories for binary files (such as /usr/bin) to allow easy access.

The distribution tape is written in tar format on the IOS tape drive. It contains about 70 files in several directories. Their contents are described below.

```
REDUCEdir/bin:  reduce, reducelib
REDUCEdir/jobs: mkreduce, compile, compile1, build, mkcomp
REDUCEdir/doc:  Installation guide (this manual)
                 User's Manual (about 200 pages)
                 Addendum to the User's Manual (about 200 pages)
                 User's Guide (< 10 pages)
                 bugs33 (about 5 pages, described below)
```

REDUCEdir/barepsl files for installation of barepsl
 (can be removed after installation process)

REDUCEdir/src: alg1, alg2, bfloat, boot, build, compat,
 entry, factor, hephys, int, matr, mkfasl,
 rend, rlisp, solve, algint, anum, arith,
 excalc, ezgcd, gentran, groebner, prolog,
 rcref, rsltnt, spde, symflags, util

REDUCEdir/lessons lesson1 .. lesson7

REDUCEdir/tests standard REDUCE test (file test), bfloat,
 int, factor, solve, algint, anum, complex,
 excalc, ezgcd, gentran, groebner, spde

3. Installing REDUCE

REDUCE is stored in the system as a binary executable disk file plus a library of loadable modules (automatically loadable at runtime) called reducelib. A standard version of both files is undumped from tape to disk. The file reduce (which is the absolute binary file) needs a little bit of configuration, especially the value of REDUCEdir must be incorporated so that the reducelib can be opened automatically at startup time.

There are two ways to install an appropriate version of the absolute binary file: We recommend to rebuild reduce from sources and to compile the sources in REDUCEdir/barepsl. Though this takes about 20 seconds of cpu time, it avoids system incompatibilities such as different versions of the operating system and EMA/nonEMA machines. The rebuild is done by:

```
cd REDUCEdir/barepsl
make barepsl
cd REDUCEdir
jobs/build
```

The second way is using the absolute binary from tape by

```
cd REDUCEdir/bin
../jobs/mkreduce
```

After that REDUCEdir/bin contains a customized version of reduce. The file reducelib needs no configuration. The access path of the reducelib is written into the absolute binary, so do not move the reducelib afterwards.

After deciding which way to go, please modify the welcome banner accordingly (not the date!* variable since this is a date for the version) in either jobs/build or jobs/mkreduce. It may be useful to modify the heap memory default (set by the set!-heap!-size command) too.

During the building of the REDUCE absolute binary, a message saying a function has not been defined is normal, and can therefore be ignored.

4. Printing Documents

The distributed documents are paginated and formatted with standard ASCII control characters. A maximum of 60 print lines per page is assumed. In some cases the left margin offset must be supplied by the user.

5. Testing REDUCE

For testing the REDUCE implementation testjobs are provided in directory tests. The REDUCE standard test should be done in any case, it should consume approximately 1 CPU second on an X-MP and 1.5 seconds on a CRAY 1 (without garbage collection time).

If the test does not run, please check the installation procedure, and if this will not resolve the problem, call for help.

6. Running REDUCE Programs

Reduce can be invoked by the command:

```
reduce                (path set appropriate)
```

REDUCE will respond with some banner lines and welcome messages printed to standard output and then prompt for the first line from file standard input:

```
REDUCE 3.3. 15-Jan-88...
```

```
1:
```

Prototypical instructions for using the CRAY (UNICOS) implementation of REDUCE are available in the user's guide. You should edit this to reflect your site

specific implementation before issuing it to users. System independent instructions for the use of REDUCE are given in the REDUCE User's Manual.

7. Working with Minimal Disk Space

Many of the REDUCE system files are not necessary for running REDUCE. In situations where disk space is at a premium, (which is true for CRAY disks normally), the following files may be deleted from disk and stored on frontend disks instead:

- the barepsl file,
- the files containing sources, jobs, documentation and tests.

Only the absolute binary reduce (after running job mkreduce) and the library reducelib must reside on disk. You may even get the idea to reorganize the reducelib by deleting some members like rlisp, rend, entry, alg1, alg2, and fastbig which are needed only at rebuild time and not from a running REDUCE application. Please be careful, you must read about the library feature first. (see H. Melenk and W. Neun: Portable Standard LISP, Implementation for CRAY X-MP computers, ZIB Technical Report TR 86-4)

8. Rebuilding REDUCE Fasl Files

Because of its organization into independently compilable modules, the current REDUCE system is fairly easy to maintain. If any source updates are necessary, they can be incorporated into the appropriate files using a convenient editor. Once any of the system source files have been updated, it is necessary to rebuild (compile) the equivalent load modules in order to utilize the changes. With the CRAY version, the binary load modules should be held in a library.

To rebuild any of the REDUCE fasl files please use the job 'compile1' provided for this as a sample.

If any of the binaries in building the REDUCE system are changed (alg1, alg2, arith, entry, prolog, rend, rlisp), the reduce binary image will need to be rebuilt, please use 'build'!

A separate job 'compile' is available for complete rebuilding all of the REDUCE binaries. This should normally never be required and is included only in case the system becomes so corrupted that it is no longer possible to rebuild even single modules with the 'compile1' procedure, or with an upgrade of the PSL compiler.

9. Inquiries and Reporting of Errors

All bugs and problems in REDUCE 3.3 known to the authors of REDUCE are listed in the bugs33 document. We would appreciate hearing about any other bugs you encounter or questions you may have regarding the assembly or the operation of the system. Also deficiencies in the installation process are of interest for us. Suspected errors should be accompanied by the relevant job output and a copy of the input source. Corrections for documented problems or other improvements to the system are also welcome.

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